

Considerations for Replacement Heifer Housing

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Introduction

The calves and heifers on a dairy farm represent the future of the milking herd. Beginning at birth, the replacement animals should be the best of the lot, genetically superior to the older animals. Accomplishing this is the result of a well-managed breeding program; taking advantage of the genetic superiority requires that nutrition, health and housing are part of the management program as well.

For healthy, potentially high producing replacement animals, the housing environment should provide adequate space for water, feed, resting and exercise. High humidities are especially detrimental to animal health requiring adequate ventilation to remove the moisture produced by the animals themselves. Adequate ventilation also removes other air pollutants so as to maintain suitable air quality.

Management Groups

Planning for new construction or remodeling of the facilities on a dairy farm must be based on a sound management plan. The plan sets forth all factors related to nutrition, health and growth as well as all other activities of the dairy farm operation. The buildings and equipment which comprise dairy facilities are merely tools which allow essential tasks prescribed by the management plan to be carried out on a regular basis.

Divide replacement animals into groups according to age or size and a management plan. This allows each group to be treated according to its needs. Begin with providing a clean, dry maternity area for the newborn calf. Maternity pens are preferably separate from other animals.

From birth to age of weaning (two months), provide individual hutches, pens or stalls. Cold housing is preferred.

Give special consideration to newly-weaned calves as they adjust to being in groups. A transition area where group size is limited and ample bedding is provided lessens stress during this adjustment period. Providing transition housing for calves from weaning to 5 or 6 months of age emphasizes that this is a special group of calves with special needs.

Six- to 24-month-old heifers can withstand the stress of larger groups. Consider heifer age and size when forming groups. Group size is related to herd makeup, management, and feeding practices. When possible, maintain

uniform animal size within a group to reduce stress and injury. Divide heifers into groups according to a management plan that considers differences in nutritional requirements, medical treatments and other procedures, and breeding. For example, it is logical to transfer heifers to the next group when they are bred.

Table 1 gives typical herd makeups assuming uniform calving year-round. Use this table to determine housing needs for age groups in a replacement management plan.

Table 1. Typical Herd Makeup

	Number of animals			
	40	75	100	250
Herd size = total cows	40	75	100	250
Cows milking	33	62	83	208
Cows dry	7	13	17	42
Heifers:				
16 - 24 mo	15	28	38	95
13 - 15 mo	5	9	12	30
9 - 12 mo	7	13	18	43
6 - 8 mo	5	10	12	31
3 - 5 mo	5	9	12	31
Calves 0 - 2 mo	3	6	8	20
Total replacements	40	75	100	250

Numbers in table assume uniform calving year-round, 12 month calving interval, no death loss or culling, 50% male and 50% female calves, and all males sold at birth.

Environmental Aspects

Besides serving as management tools, dairy facilities provide an environment for the animals. The calves, heifers and cows on the dairy farm must be given an environment that permits them to grow, mature, reproduce and maintain health. If the basic needs of the animals are not being met, no amount of management can assure success.

Dairy animals, like other livestock and poultry, are capable of maintaining a relatively constant body temperature through a wide range of ambient temperatures. Basically, animals have the ability, within certain limits, to achieve a balance between the heat they produce (metabolic heat) and the heat gained from or lost to the surroundings, a process referred to as thermoregulation.

Certain housing design and management practices can positively influence thermoregulation: others can produce negative effects. Any circumstance detrimental to thermoregulation—such as an excessive rate of heat loss from the body—usually stresses the animal; thermal stress in turn increases the animal's susceptibility to infectious disease. For example, in cold weather, a thick, dry erect haircoat is essential to reducing the heat loss from the calf or heifer and, thus, reducing thermal stress. Providing dry bedding helps to maintain a dry haircoat which acts as thermal insulation.

Animal health and disease are also influenced by air quality which, in turn, is related to ventilation. The aerosol exchange of pathogens among animals and the influence of air pollutants on pulmonary defense mechanisms are important, especially to respiratory health. Ventilation continuously replaces contaminated air with fresh outside air which reduces the concentration of aerosol pathogens. Ventilation removes the moisture produced by the animals as well, thus maintaining a more desirable relative humidity. Maintaining a relative humidity in the range of 55% to 75% results in the shortest survival time for the greatest number of potential pathogens.

Reducing the concentrations of airborne pathogens and noxious gases are important reasons for providing ventilation, but if sufficient ventilation is provided for moisture control during the winter, the undesirable effects of airborne pollutants apparently are minimized.

Calf Housing

Providing the proper environment for a calf amounts to furnishing conditions that enhance the calf's inherent ability to achieve thermoregulation and using ventilation to provide moisture control and to maintain suitable air quality. This can be achieved in a warm housing unit with the proper mechanical ventilation, heating, insulation, controls, and management. An attractive alternative is cold housing in which ventilation is accomplished by natural air movement at considerably lower initial cost and operating cost.

The aim is to provide dry, relatively draft-free surroundings, especially in the winter. Any attempt to house animals in an enclosed building without adequate ventilation will result in excessively high humidities that complicate problems of air quality, disease transmission, and condensation; the net result will be generally unhealthy conditions. If a calf barn smells like a calf barn, it probably lacks proper ventilation.

Calves often do as well or better in cold housing than in warm housing, and cold housing is less costly to build and operate. A major goal of warm housing is the comfort of those caring for the calves; winter conditions are more uncomfortable for these persons than for the calves themselves.

Calf hutches are being used successfully on dairy

farms in most states. The typical hutch is 4' x 8' x 4' in size; one calf occupies each hutch. The hutch has no bottom. Leave one end of the hutch open and provide a wire fence enclosure so the calf can move outside. The fence can be taken off in winter to ease snow removal; closing only the lower front of the hutch is sufficient to keep the calf in. Except for the front and the bottom, tightly seal all other sections of the hutch to reduce the wind blowing through the hutch in the winter.

Locate hutches in a well-drained area. Spread a sand base over an area large enough to allow each hutch to be moved to a clean spot after its calf is removed. The sand base also lessens the possibility that the hutches will freeze fast to the ground in the winter. Have more hutches than normally needed so that each hutch can be vacant for two to three weeks after it is cleaned and moved to a new spot.

Cold housing also can be provided in a naturally ventilated building which has an open ridge and openings under the eaves, enabling natural ventilation to remove the moisture produced by the calves in winter (Figure 1). In summer, fully open sidewalls and endwalls (covered by fabric in winter) take advantage of winds for ventilation (Figure 2). In winter, air movement through the building should be sufficient to maintain inside temperature only slightly above outside temperature. Hang a thermometer inside the barn. If the temperature inside is more than 10-15° F above outside temperature in winter, more ventilation is necessary. A pen with three solid sides, 4' x 8' x 4' in size, minimizes drafts. Cover the back third of the pen to give the calf additional protection in especially drafty locations. A wire mesh front improves air movement through the pen in summer. A heated and insulated workroom equipped with a hot water heater, sink, refrigerator and freezer provides a convenient place to prepare milk replacer, wash feeding equipment, store feed and supplies and keep records.

Calves may be housed inside in certain winter situations and outside the remainder of the year. For example, hutches can be moved into a well-ventilated building during the winter months. The hutch already protects the calf; the move to inside quarters is merely a convenience to the person caring for the calves.

Transition Housing

Being moved from individual to group housing is an abrupt change for a newly-weaned calf. Giving special consideration to the calf's environment can make this transition less stressful as the calf adjusts to group living and learns to compete with other calves.

Provide transition housing for calves from weaning to 5-6 months of age. Maintain small groups. For a 100-cow dairy, 4-6 calves per group will sufficiently minimize the difference in size among calves in the group. Well-bedded pens should allow 25-30 sq. ft. per calf—a 12 ft. x 12 ft. pen will hold up to 5 calves. The environment should be similar

Figure 1. A cold calf barn with natural ventilation—open ridge and open eaves for winter; sidewalls (and endwalls) fully open in summer, covered by fabric in winter. Three solid pen sides reduce drafts.

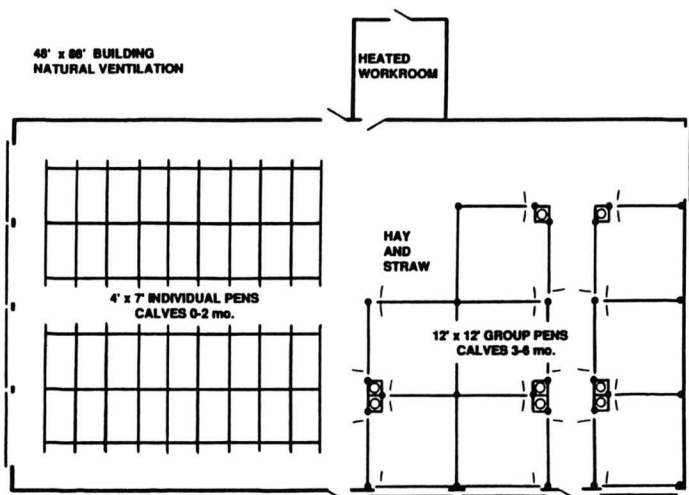
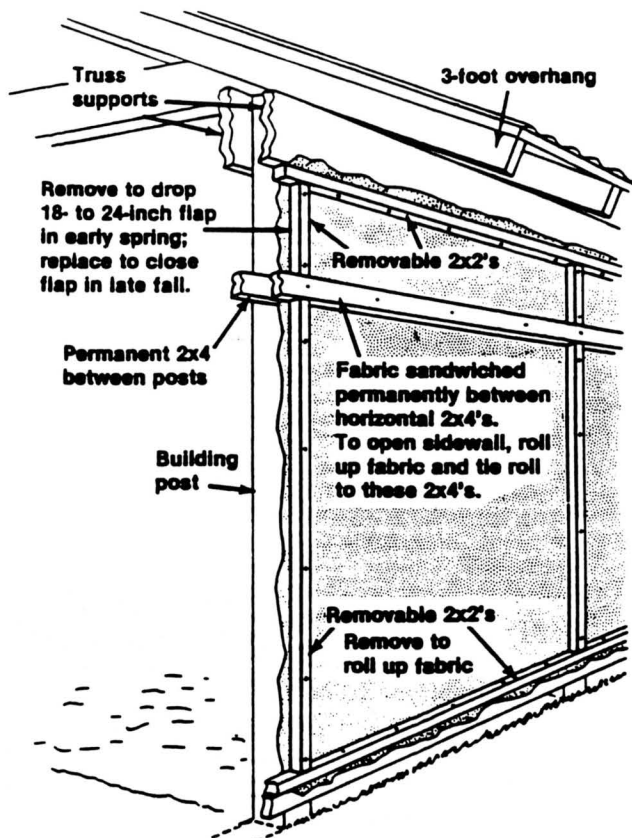


Figure 2. Full wall ventilation; fully open in summer, covered with fabric or other material in winter.



to the environment to which the calves have already become acclimated with sufficient ventilation for moisture control and protection from the elements in winter.

A portable calf shelter or a super hutch can provide transition housing for calves that have been raised in individual hutches or other cold housing. Use these open-front shelters in combination with a small pasture or a paved lot where feed and water are provided. Keep the shelter well-bedded. Capacity is eight calves up to 400 lbs. To improve summertime conditions, traditional sidewall materials are being removed from super hutches. Sidewalls and endwalls are covered with fabric in winter. Thus, the super hutch serves the purposes for which it is intended—a sunshade in summer and a windbreak in winter.

Transition pens for small groups can be located in a building that has natural ventilation. This might be the same building that houses the smaller calves in individual pens prior to weaning.

For a larger herd, construction of a building specifically for transition housing may be justified. A transition barn (Figure 3) houses several groups of calves from weaning to 5 or 6 months.

Existing buildings may need remodeling so that natural ventilation can be relied upon to control moisture and temperature. The building should be visualized as a shelter and should be opened up sufficiently so that inside temperatures stay about the same as those outside. Remove existing ceilings and open the ridge. If the ridge can't be opened conveniently the full length of the building, holes may be cut in the peak to provide an outlet area equivalent to an open ridge. For summer, fully open sidewalls and endwalls, removing all possible obstructions to air flow. Cover the sidewalls and endwalls with fabric in winter.

Heifers

In colder climates, heifers are usually housed on a bedded pack or in free stalls, at least in winter. There has been some interest in a heifer-raising facility developed in Virginia that is based on counter-sloped, self-cleaning floors and is intended for use with little or no bedding. Regardless of housing type, animals should be grouped according to a management plan. Variations in size and nutritional health and reproductive needs can then be accommodated.

Bedded Pack

Bedded pack housing is used in conjunction with an outside exercise area and outside feeding or in a barn which includes feeding so that all animal traffic areas are covered. The bedded resting area should provide at least 30-35 sq. ft. per head for animals 9-15 months of age and 35-40 sq. ft. for 15-24 months. If feeding is to be inside, provide a separate paved feed alley, 10-12 ft. wide, that will be scraped periodically. (Figure 4).

Bedding is added to the pack on a regular basis. Manure and bedding are then removed as a solid 2-4 times per year.

Figure 3. A transition barn for calves from weaning to 5 or 6 months. The front is open year-round; back and end walls are left fully open in summer and are covered by fabric in winter. Gate arrangements simplify cleaning the barns and movement of calves.

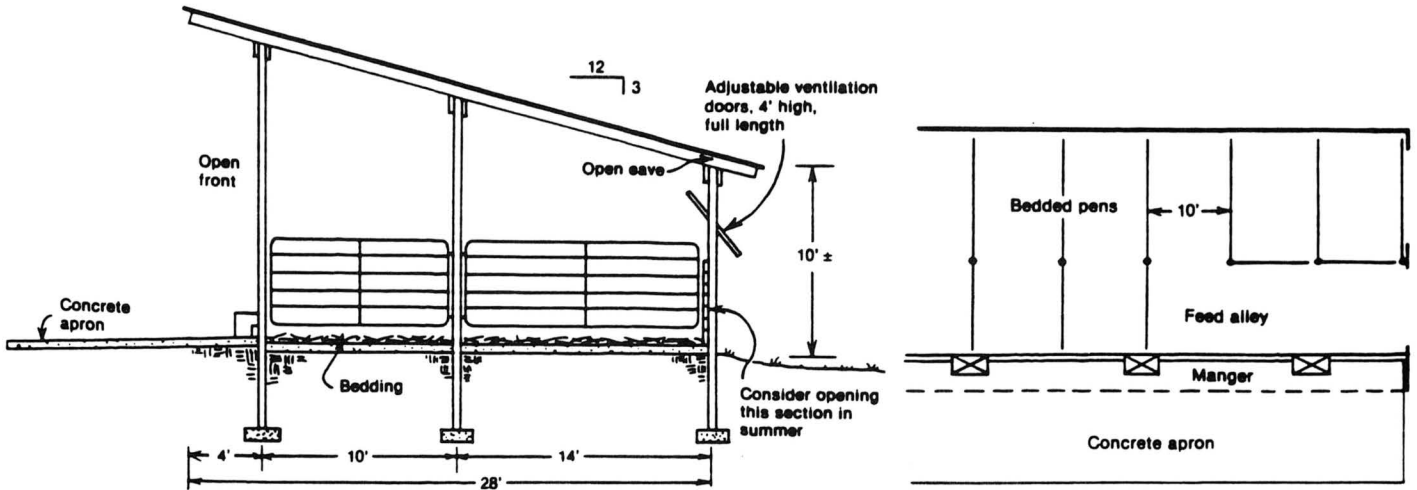


Figure 4. A bedded pack heifer barn. Gates across the scraped alley hold animals in the bedded pens during scraping. Depth of bedded pens is sufficient to allow the option of installing free stalls later.

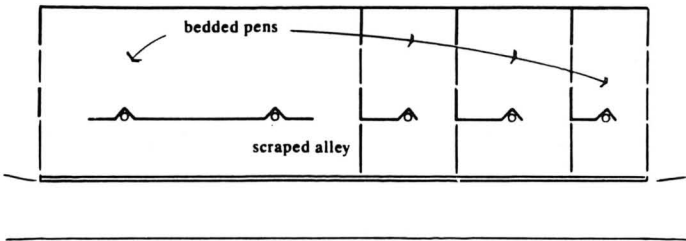
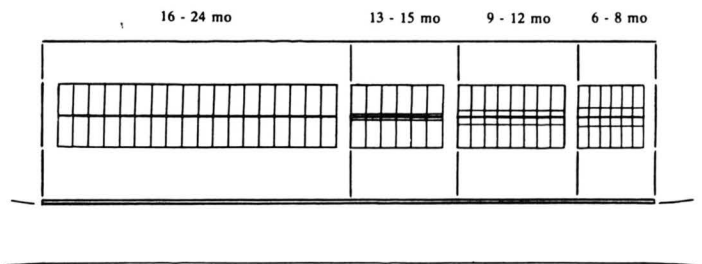


Figure 5. A free stall heifer barn. Feeding is along open south or east side. In summer, back and end walls are fully open also.



Free Stalls

Free stall housing requires considerably less bedding than bedded pack housing. Again, animals are grouped by age or size and free stalls are sized accordingly (Table 2). Free stalls have been constructed in bays under roof with animals having access to an outside lot for exercise and feeding. However, the trend is toward having both the free stalls and feeding included under the building roof (Figure 5). Outside exercise areas may still be provided with optional use during periods of inclement weather.

Table 2. Free stall sizes for heifers.

Age (mo)	Weight (lbs)	Stall size	
		Width (in)	Length (in)
6 - 8	360 - 490	30	60
9 - 12	490 - 650	33	64
13 - 15	650 - 780	37	72
16 - 24	780 - 1200	42	78

Having two or three rows of free stalls along one side of a single bunk, all under roof, provides flexibility in feeding system design. Depending upon the particular layout, feeding may be accomplished with a feed cart, a mechanical bunk feeder or a mobile scale-mixer.

Counter-Sloped Barn (Virginia Plan)

This youngstock housing facility developed in Virginia is based on a sloped resting floor and a sloped feeding floor separated by a tractor-scraped alley. The resting and feeding floors, both sloped 1 in 12 toward the center alley, are self-cleaning. Bedding is optional.

The main advantage of this design is low investment — less than 50% of the investment required for a free-stall facility. But heifers are usually housed in these barns only until breeding age.

Handling and Restraint

Provide means of restraining calves and heifers for medical examination, treatments such as vaccinations and dehorning, weighing, artificial insemination, estrus syn-

chronization, and other procedures as needed. Include provisions for observing animals for signs of heat, injury, etc., and a means of separating an animal from the rest of a group. As a general rule, one person should be able to separate and restrain an animal.

Each management group must be provided with a method of restraint. Choice of method will vary with age or size and the particular housing facility. Options include rope and halter (for smaller animals), individual stanchions, headgates and gang-lock stanchions. Use these in combination with corrals, chutes and pens. Do not examine or treat animals in the milking parlor. It is not designed for these purposes.

Give uppermost consideration to safety in all cases; safety of persons handling, examining and treating animals and safety of all animals themselves.

Summary

The buildings and equipment which comprise dairy fa-

cilities serve as tools for carrying out essential tasks prescribed by the management plan. These facilities, in fact, make it possible to implement a management program. In addition, dairy facilities provide an environment for the animals. This environment is vital to calves, heifers and cows as they grow, mature, reproduce and produce milk. If the basic needs of the animals are not being met, no amount of management can assure success.

Changes in the buildings and equipment on a dairy farm should occur only after careful planning. Do not invest in facilities as a substitute for solving a particular problem that is a result of lack of management. Buildings and equipment, new or otherwise, are never an alternative to sound management. Rather, invest in facilities that will show a return and in facilities that are necessary to fulfill the requirements of a sound management program. Buildings and equipment, in themselves, are no panacea.

